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The "Ursa" flora of Bear Island, with *Calymmatotheca*, *Pseudobornia*, *Lepidodendron* cf. *pedroanum*, and *Bothrodendron* (*B. kiltorkense* and others), has, with the exception of the comprehensive *Stigmaria ficoides*, nothing definite in common with the Lower Carboniferous flora, and appears to be nearest related to the *Kiltarkan* flora of upper Devonian age, or perhaps it represents the transition from the Devonian to the Carboniferous.

Finally, Dr. Nathorst discovers no difference in the character of the vegetation in the Devonian or Lower Carboniferous of the Arctic zone and that of the contemporaneous deposits in other parts of Europe, both the ferns and the Lycopods being of full size and apparently grown under conditions equally favorable, so that, so far as yet known, fossil plants offer no evidence of a difference in climate at those periods, between the Arctic and the lower latitudes of Europe. We may add that the same climatic conditions appear to have existed contemporaneously in the Appalachian region of the United States.—DAVID WHITE.

A Biological Examination of Lake Michigan in the Traverse Bay Region.—The Sixth Bulletin of the Michigan Fish Commission bears this title and in some one hundred pages records the work done by Dr. H. B. Ward and an efficient corps of assistants. Besides Dr. Ward's report, there are to be found within the covers of the bulletin the reports of five others, either assistants or those to whom specimens were sent. Aquatic plants are treated by H. D. Thompson, the Protozoa by Dr. C. A. Kofoid, the Rotifera by H. S. Jennings, the Turbellaria by Dr. W. McM. Woodworth and the Mollusca by Bryant Walker.

The objects of the work were a study of the life of the lake in all its manifold relations and especially of those factors which bear upon the welfare of food fishes in general and of the young white fish in particular.

The more important conclusions that Dr. Ward arrives at are :

That 63 per cent of the food of the common white fish, *Coregonus clupeiformis* consists of Crustacea. Twenty per cent of this is formed by *Mysis relicta* Loven, and 43 per cent by *Pontoporeia hoyi* Smith. After the crustacea come small mollusks at the rate of 26 per cent, made up mostly of several species of *Pisidium*.

That the ultimate source of the food supply is found in the plankton of which he estimates that there is for Lake Michigan almost 9,300,000 cubic meters, representing a weight of from 102,300 to 118,600 metric tons, or 12 to 16 pounds to each acre of surface. With Hensen he

concludes that the productiveness of the water about equals that of the land ; but, at the same time, he points out that there is an element of error in these comparisons since they are made with an artificial productiveness in the land.

The plankton does not occur in swarms ; and that it gradually increases to a depth of 30 meters, below which it decreases. The variations found in distribution through different strata of water are probably due to vertical migration.

The uniform distribution of the plankton indicates that the fish feeding upon it find a limited food supply everywhere.

The bottom flora and fauna are not sufficient to maintain large numbers of bottom-fish. The well known migrations of white fish along shore seem thus to be correlated with the non-localized food supply.

There is a plentiful supply of white fish food on the old fishing grounds and no reason can be given for a diminution in the supply of white fish except over catching.

Finally he speaks strongly and with the very best of reason in favor of the fisherman and pisciculturist being given the same governmental attention that is given the agriculturist. Piscatorial stations where the best of investigatorial talent may be employed continually would not only offer the best means for preventing the extinction of the food fishes, but would enable the piscatorialist to maintain a good supply.—F. C. KENYON.

Proceedings of the Indiana Academy of Sciences for 1895.
—Several times we have had occasion to notice the volumes put out by the Indiana Academy of Sciences, and always in a favorable manner. The present volume, recently issued (although its title page bears date February 1896) proves no exception. These 300 pages contain papers on mathematics, physics, chemistry, botany, zoology, physiology and hygiene, the total presented in full or in abstract numbering. Of these, but a few can be mentioned here. In his presidential address Mr. A. W. Butler discusses the changes in the flora and fauna which have occurred since the beginning of the century and these changes have been numerous and important. Many are the animals, once abundant, which are now rare or exterminated. Read Audubon's account of a pigeon roost and now "a single pigeon in a year." Mr. A. H. Purdue presents his studies of the earthquake of Oct. 31, 1895, the greatest in the Mississippi Valley since 1811, and the interesting fact was brought out that its epicentrum nearly coincided with that of